Ins. a1 Ins. a2

The subject of the present invention is a motorized reduction gear intended for functional equipment of a vehicle, such as a window lifter, sunroof, etc.

Such a motorized reduction gear comprises a rotor provided with a rotor shaft bearing a commutator, and a reduction gearbox containing a gearwheel engaged with a worm belonging to the shaft. In order that the number of shaft rotations can be counted, a magnetic ring is mounted on the shaft, between the commutator and a rolling bearing placed in the gearbox. This mounting is achieved by force (a "press fit") using longitudinal notches made on the shaft, which hold the ring in place.

This arrangement therefore requires two pieces to be assembled on the motorized reduction gear assembly lines. It is found that, after a certain time in service, the retention of the ring on the shaft becomes insecure, the ring having a tendency to detach from the shaft, which may in certain cases even lead to the destruction of this magnetic ring. This defective retention of the ring on the shaft may arise from a fault in the alignment of the ring with the shaft during the assembly operation, and, where appropriate, from the fact that the internal diameter of the magnetic ring is too small.

The aim of the invention is therefore to provide a motorized reduction gear in which the magnetic ring for counting the shaft rotation rate is attached to the shaft in a way which is more reliable over time.

Ins. a3 Ins. a4

~~According to the invention, the magnetic ring is attached to the commutator of the shaft~~.

This attachment to the commutator can be carried out more securely than attachment to the part of the shaft between the commutator and the bearing, and can be by various means.

Ins a5

~~According to one embodiment of the invention,~~ the magnetic ring is overmoulded on the body of the commutator.

According to a second possible embodiment, the magnetic ring is housed in an annular recess which is on the body of the commutator, on which it is ~~adhesively bonded or overmoulded.~~

Ins a6

Other particular features and advantages of the invention will appear during the following description, given with reference to the appended drawings which illustrate several possible embodiments thereof.

Figure 1 is a view in longitudinal elevation and partial section of a motorized reduction gear for driving functional equipment of motor vehicles, according to the prior art of the invention.

Figure 2 is a view in longitudinal elevation of the commutator of the motorized reduction gear, equipped with a magnetic counting ring attached according to a first embodiment of the invention.

Figures 3, 4 and 5 are views in elevation of the commutator which are similar to Figure 2, showing three other possible embodiments of the invention.

Ins a7

The motorized reduction gear 1 illustrated in Figure 1 is intended especially for driving functional equipment of vehicles, such as electric window-lifters and sunroofs.

Ins a8

~~It comprises, housed inside a casing which can~~ be powered by electrical connections (not shown), a stator 3 and a rotor 4 provided with a rotor shaft 5, the ends of which are mounted in rolling bearings 6, 7. This rotor shaft bears a worm 8 engaged with a gearwheel (not shown) which can drive an output member (also not shown), which itself drives the equipment associated with the motorized reduction gear, for ~~example, a window lifter.~~

The rotor shaft 5 bears a commutator 9 equipped on its periphery with a series of hooks 11 for retaining the electrical connections 12 of the rotor 4. The shaft 5 is housed inside a reduction gearbox 13

which also contains the gearwheel and the output member.

The motorized reduction gear 1 is provided with a magnetic ring 14 mounted, according to the prior art of the invention as illustrated in Figure 1, on the part of the shaft 5 between the commutator 9 and a rolling bearing 15 housed in the reduction gearbox 13. This magnetic ring 14 is held in place by means of longitudinal notches 16 in the shaft 5 and has the function of enabling the rotation rate of the shaft 5 to be measured, in combination with known means (not shown).

According to a first embodiment of the invention, illustrated in Figure 2, the motorized reduction gear 1 is fitted with a magnetic ring 17 overmoulded on the body 18 of the commutator 9. The ring 17 forms a bushing lying over substantially the entire length of the body 18, the hooks 11 being themselves attached to the periphery of the ring 17, which forms an integral part of the commutator 9.

In the second embodiment of the invention, illustrated in Figure 3, the magnetic ring 19 is housed in an annular recess 21 which is on the body 22 of the commutator 23 at that end of it which is free of hooks 11. The ring 19 is attached within the recess 21 by adhesive bonding or by overmoulding.

In the third embodiment of the invention illustrated in Figure 4, the magnetic ring 24 is elastically clipped onto an annular extension 25 of the body 26 of the commutator 20. This extension 25 defines, in that end of the body 26 which is free of hooks 11, an annular housing 27 in which a radially projecting end 24a of the ring 24 can be clipped, after passing over a terminal boss 25a projecting radially from the extension 25.

In the fourth embodiment of the invention illustrated in Figure 5, the magnetic ring 28 is attached to one end of the commutator 29 which is free of hooks 11, by at least two screws 31 parallel to the

longitudinal axis XX of the commutator 29 and diametrically opposed. The screws 31 pass through the entire width of the ring 28, screwing into the body 32 of the commutator 29.

Other means for attaching the magnetic ring to the commutator of the motorized reduction gear can be envisaged within the scope of the invention. Attaching the ring directly to the body of the commutator makes it possible to achieve a secure and lasting assembly.

Ins. a''